consortium may choose to specify a TDMA system which could potentially be supplied by either Ericsson or Motorola. Another multiple city, multiple agency consortium may specify a system that must be Project 25 compatible. This system could potentially be supplied by EF Johnson/RACAL, RELM and/or Motorola. In addition, this buyer could acquire system backbone from one supplier and stand alone base stations, conventional repeaters and subscriber units from five or six other suppliers.

It is difficult for the Project 25 Steering Committee to understand how anyone can claim that by moving from an environment where only two suppliers (GE/Ericsson and Motorola) supplied the majority of the systems and all of the subscriber equipment to an environment where the consumer has not only a choice of proprietary vs. non-proprietary, but a choice of subscriber equipment suppliers, can be less competitive. We strongly believe our Project 25 standards will be bringing to the marketplace "competition in the supply of goods and services" needed for the public safety community. While we fight for competition, others appear to fight against competition in hope of protecting market share.

Fair and Open Processes:

The Project 25 Steering Committee supports the concept of a "fair and open process" for standards development. However, we see Ericsson's minority proposal to have the Commission codify a certified standards process as yet another effort by Ericsson to delay and disrupt a truly open and fair user-driven process. The last four years of our Project 25 standards process suggest that some of our opponents will apparently stop at nothing to

delay a user-driven standard that does not fit their business plan or catalog of products. Therefore, we view both the minority report in PSWAC and the Commission promotion of that concept with a jaundiced eye.

Are Certified Standards Necessary:

The Project 25 Steering Committee agrees with the Commission's assessment that Congress created Sections 273 (d)(4) of the Telecommunications Act of 1996 to govern the procedure for developing emerging standards for regulated telecommunications carriers and services providers. In light of Congress' obvious intent to create a very specific piece of legislation with a very narrow focus, we find it a difficult stretch of logic for either the authors of the PSWAC minority report or the Commission to attempt to apply the same standards management process to non-public services carriers. We are at a loss to understand how anyone can create a comparison between the need to regulate this nation's telephone and common carrier providers and this nation's public safety agencies.

On one hand, you have highly regulated service providers required to furnish basic "essential service" to every home in the nation. On the other hand, you have individual public safety agencies that generally only provide service to a limited number of users. Obviously, the regulated telephone companies and common carrier providers must have a number of mechanisms, including regulated standards processes, to protect their networks from hardware and applications that may inadvertently denigrate the level of service they provide to all of their subscribers within a given service area, state, nation or the world. The potential problem of non-standard equipment operating in a government-owned public safety system is much less. While a telephone company or common carrier provider

would have a difficult, if not impossible, task controlling what was attached to their networks without standards, that has not historically been the problem in the public safety environment. Most importantly, the standards that are applied to the telephone companies and common carriers are generally mandatory, whereas public safety standards are permissive. Even with the precedent-breaking "Carter Phone" decision, the added value supplier was required to meet certain technology standards to prevent degradation of the public network. Once again, the Commission in its own rules recognizes that public safety users operate a "private" network, not a public one.

Clearly, the Project 25 Steering Committee recognizes the concept of a "fair and open" standards-setting process is critical to any standards process. However, it does not necessarily follow that to have a "fair and open" standards process we need more Federal government control and intervention. Obviously, if the United States had a national police force such as you often find in Europe, there could be a stronger argument for a so-called certified standards process because one would in fact be dealing with a common and ubiquitous network much like the telephone and common carrier networks. However, that is not the case in America; here, each public safety agency is responsible to its own political constituents without regard to what may or may not be taking place in the next county or the next state. In fact, the core of our Project 25 voluntary standards is predicated on protecting the right and obligation of local public safety agencies to select the technologies and standards that best fit their needs, regardless of how it may or may not fit in a specific manufacturer's product line or, in our case, a specific standard.

We are also concerned that the concept espoused in the PSWAC minority report and currently being considered by the Commission flies in the face of "States Rights." State and local government agencies have a right to choose any voluntary standard they want, as long as that standard fits within the Commission's defined technology standards. Further, if the Commission has some concerns about a standard they are considering for adoption as an FCC standard, then we support their right to take into consideration the process that was used to establish that standard as well as the actual standard. At that time, those who feel the process is flawed certainly have a right to attempt to document and support that charge. Conversely, the Project 25 Steering Committee doubts that the Commission intends to adopt every standard that is created or proposed regardless of its genesis. We believe it is the Commission's responsibility to decide which technologies are compliant with the FCC rules and regulations, without regard to whether those standards were created through so-called "certified standards process." Therefore, we believe the Commission should focus its attention on how they intend to evaluate the myriad of standards which they may be considering for adoption as Federal "FCC standards" rather than attempting to determine which technologies they need and want.

The Value of Project 25 Phase I Standards:

As a matter of record, we want to make clear that the Project 25 Steering Committee believes our Phase I standards process and our new Phase II and Project 34 standards efforts fully comply with the concept of an "open and fair" standards process; we are ready to support that claim any time the Commission is ready to begin its consideration of

digital interoperability standards. We will continue to work closely with our partners in TIA to ensure our efforts do not restrict the free exchange of ideas.

In fact, our process has been so open that since 1993 we have graciously and willingly accepted the continued participation of some of our standards opponents whose primary purpose appears to be to delay and obstruct the final adoption of our voluntary Project 25 Standards. The public and private efforts of our opponents to lobby both their peers in the industry and public officials in an effort to ensure their perspective are a matter of public record. Yet they were and are today still welcome in **our** process.

The Nationwide and Worldwide Impact of Project 25 Standards:

Without regard to our concerns, the Commission should be aware that we believe it is fair and reasonable for the Commission to consider the issue of "Certified Standards Process" if it deems it appropriate. Although we support the Commission's right to address this issue, we would implore them not to act precipitously. The entire issue of standards and standards acceptance is extremely important to all the participants in our Project 25 process. At the present time, Project 25 standards are in the final stages of consideration within the Federal government as Federal voluntary standards, within numerous Federal agencies as agency voluntary standards, within one branch of the military as their standard and within the International Telecommunications Union as an ITU standard. As the Commission decides how to treat standards created by "users" and standards created by a so-called "certified standards organization," it must also decide how they intend to treat Federal Government, Federal Agency, ITU, and other international standards.

We also think the Commission needs to provide public safety and other telecommunications users[7] a detailed plan on how they would implement and manage any rules that mirrored those being considered. Finally, we encourage the Commission to carefully consider the negative impact and potential problems they may create if they establish rules that require the use of a so-called "certified standards organization" without applying the same criteria to the entire telecommunications industry.

Conclusion:

In conclusion, the Project 25 Steering Committee applauds the Commission for their efforts to protect our critical public safety user needs. We are pleased that they understand the importance of interoperability and our pressing need for additional spectrum. We are encouraged by the Commission's desire to seek out new solutions and better ways to provide our services.

In spite of all the positive attributes of the Commission's NPRM, we find the discussion regarding the need to officially designate 25 KHz analog FM flawed and without merit. We also oppose any proposal for the Federal Communications Commission to arbitrarily intervene in any users standard process.

Our opposition to current proposals should not be misconstrued as an unwillingness to work with the Commission and/or others to find an acceptable solution to ensuring that the concept of an "open and fair" process prevails. Our commitment to "open and fair" standards existed before the Commission's NPRM and will continue to exist long after it is completed. Project 25 is not an entity unto itself; it is a gathering of users - users who represent all levels of the public safety community.

[7] The Project 25 Steering Committee would strongly object to any regulatory proposal that treats public safety in a disparate, prejudicial and biased manner.

All of the users who participate in the Project 25 process are deeply committed to doing what is best for the public safety community as a whole. They have no special interest in any single technology or supplier of technology, Their only interest is making public safety communications more efficient and cost-effective for the citizens they serve.

Respectfully Submitted,
Project 25 Steering Committee

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October 21, 1996

The Answer to A Need:

The Project 25 Standard

George Kamerer

July 1996

Including a critical review of :

A Need to Be Heard:
Will Project 25 Meet Public Safety
Communications Needs in 1995 and Beyond
by
Charles L. Jackson
Strategic Policy Research, Inc.
July 1995

Note: The writer is a consultant to Transcrypt International Inc. and represents Transcrypt at TIA and Project 25. Transcrypt International is involved in communication electronics and is an active participant in the Project 25 standards process.

The report by Dr. Jackson of Strategic Policy Research was sponsored by Ericsson.

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An observer of the process once humorously said:

"For some people it sometimes is easier to mislead than to tell the truth"

Another comic added:

"And the repercussions may be less"

--Authors anonymous.

1 Introduction

Standards have been significant in the development of land mobile communications systems since at least 1944[1]. The current standards (TIA/EIA -603) describe analog equipment using frequency or phase modulation. The availability of very complex and cost effective integrated circuits employing digital technology permits the consideration of more complex solutions to improvements in spectrum use.

This paper will highlight some of the important history and features of the Project 25 Standard and will present an critical review of : "A Need to Be Heard..." by Dr. Charles (Chuck) Jackson. This will be referred to as ***"the report"*** in this paper.

2 How Project 25 Started

Project 25 was initiated because a number of interested users from various organizations had the vision to understand that an organized effort was necessary to insure that Public Safety communication systems were afforded a practical transition to rapidly emerging new technologies. As a result a user group was organized with the title APCO[2]/ NASTD[3]/FED[4] later to become "Project 25". A Steering Committee with representation from the three user groups was set up within Project 25 to review and select technology appropriate for the users of Public Safety organizations.

TIA[5] through it's Land Mobile Section[6] made an offer to assist Project 25 in the effort necessary to produce Public Safety 25 standards. The then chairman of the Section, Mr. Bill Blackburn from Ericsson-GE, met with representatives of Project 25 and the result was a Memorandum of Understanding (MOU) between TIA and Project 25.

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[1]TIA 1994 Standards and Technology Annual Report : pg 19

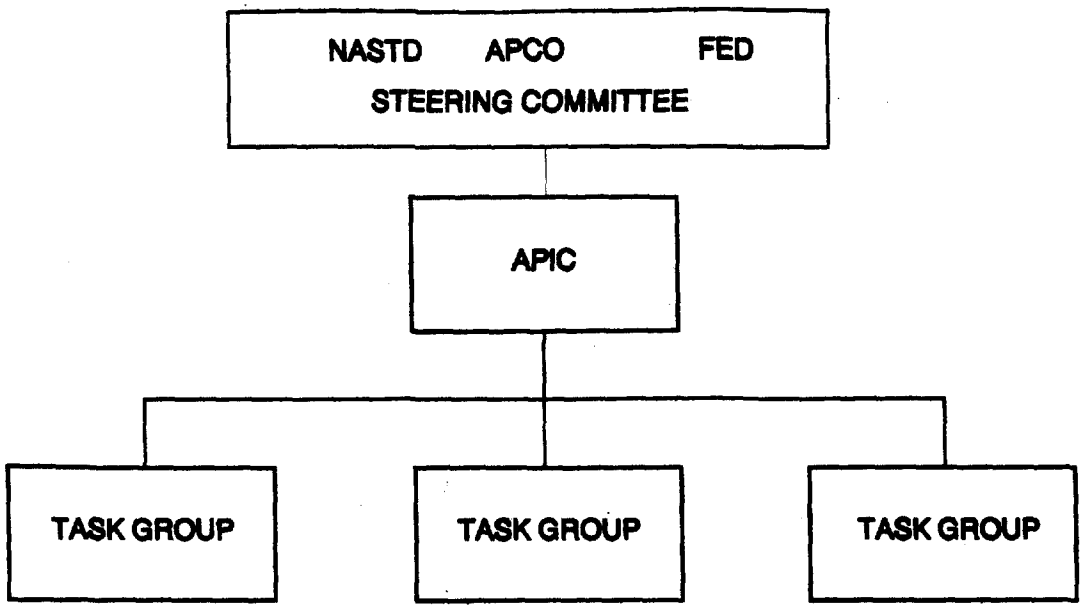
[2]Association of Police Communication Officers International

[3]The National Association of State Telecommunication Directors

[4]Representatives of the Federal Government.

[5]Telecommunications Industry Association

[6]Mobile and Personal Communications Private Radio Section



This MOU defined the agreement for TIA to assist Project 25 in standards formulation effort.

As a result of the MOU a TIA ad hoc committee was formed to coordinate the efforts of the users and manufacturing participants. This committee adopted the acronym APIC[7]. Any organization, users, service providers, consultants, domestic and foreign manufacturers, literally any one, with an interest in Public Safety communications have been encouraged to participate. In order to encourage full participation in APIC TIA waived the normally associated participation fees for APIC members. Mr. Stuart Meyer, representing Ericsson-GE was the first chairman of APIC. APIC was organized into various Task Groups with assignments ranging from the identification of technology to generation of documents suitable for Public Safety standards.

These efforts have resulted in the release of more than thirty documents describing equipment and systems applicable to the Project 25 Standard.

This outstanding result is the product of unprecedented cooperation between users, service providers, and the manufacturing community. The forum provided by APIC have allowed open participation from all facets of both the users and industry. While many of the standards issues have been hotly contested, the increased understanding of differing points of view have created a legion of solutions and new ideas which will benefit the users, industry and the public at large.

[7]APCO / TIA Interface Committee

Many of the documents are being considered as Federal Standards and parts have been proposed to international standard bodies.

This is necessarily a brief overview of the Project 25 history. Detailed information is available from APCO.[8]

3 The Benefits of Project 25 Standards

The value of standards to the buyers of equipment is generally well known. Besides the apparent value of the technical descriptions of complex products standards also can provide the buyer with a means to make a technical comparison of product offerings from competing sources. Open standards also allow the buyer to "un-bundle" component parts of a large system resulting in additional competition.

It is recognized that small companies are the engines of innovation in the U.S. economy. Statistics show that small companies have provided most of the new employment in the U.S.[9] What may be less apparent is the value of open standards to small entrepreneurial companies. The same issues that a standard provides to the user can be used to enhance the marketing capability of a small company. Compliance with a standard adds credibility to a product and tends to level the playing field. The ability for the user to "un bundle" a large system provides the means for a smaller company to compete for the subscriber unit purchases.

There is ample evidence that standards development can promote innovation and in many cases result in new intellectual property. While users and suppliers are discussing the best ways to satisfy the user's needs, new problems/requirements become evident. Such problems become the seeds of invention.

When the standards setting process facilitates the disclosure and sharing of essential intellectual property, as required by Tia policy, the consumers are assured of standards that reflect the latest in innovation and high technology.[10] The incorporation of intellectual property in standards has been described as positive and pro-competitive.[11]

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[8]The APCO Institute, Inc, 2040 S. Ridgewood Avenue, South Daytona, FL 32119-8437

[9] U.S. Department of Commerce - Statistic Abstract of the United States

[10]Letter from Dan Bart, EIA/TIA Vice President, Standards and Technology to the Federal Trade Commission, January 22, 1996

[11]IBID.

4 The Project 25 Process

Extensive deliberation by the user groups resulted in the establishment of Project 25 goals which were prepared from a background of important requirements. Some of the more important requirements which led to technical selections were:

Improved spectrum efficiency.

The provision of unit to unit communications without the required use of repeater stations.

The voice quality of the digital system must be equal or better than the quality available tin contemporary equipment.

Backwards compatibility with existing analog equipment so that a multi-step migration path may be used which permits the controlled employment of more spectrally efficient technology within the budget constraints of most public safety agencies.

Any technology which requires the instantaneous replacement of a complete system would cause financial chaos in most public funded agencies. Even the requirement for instantaneous replacement of equipment on one channel of a multi-channel systems would be a troublesome burden to most agencies.

The replacement technology must not require new or unoccupied spectrum for implementation.

Operational disruption must be minimized during any replacement transition.

The technology selected must be relatively mature with minimum technological risk.

Before any standard can be prepared it is necessary to select key parameters needed to begin the document preparation. Without these selections the standard could literally begin and end with one sentence "This is a Standard." Not very descriptive or useful and certainly not definitive.

In the case of Project 25 several important selections were required before standards documents could be prepared. Each of these parameters are to a large extent dependent on each other and the selection of one may affect the number of options available on the others.

These parameters involved:

Selection of a modulation method.
Selection of an access method.
Selection of a vocoder[12]
Selection of an appropriate channel data rate.

Proposals to satisfy the Project 25 goals were solicited from anyone who choose to participate in the debate. This included both users and manufacturers. All participants were invited to join in tests of the different proposals, as an example, modulation methods. In the case of the Vocoder an extensive "run-off" MOS[13] test of several proposed vocoders was required.

When there was more than one offering of a key parameter, the Steering Committee was burdened with choosing the parameter most appropriate from the users point of view.

A far-reaching examination of a number of different proposals resulted in the Project 25 Steering Committee choosing the following key parameters:

Modulation method : QPSK-C[14].
This modulation was most compatible with the backwards compatibility requirements and the data rate necessary for the vocoder.
Access method: FDMA[15]
This access method provides the ability to implement new technology without operational disruption.
Vocoder: IMBE[16]
This vocoder was chosen after an MOS test of several different vocoders.
Channel data rate: 9.6 kBPS
This rate was chosen satisfy both the modulation and access method requirements compatible with the Vocoder and channel control data needs.

---

[12]VOCODER - A type of voice coder. Usually consisting of a speech analyzer and a speech synthesizer which convert analog speech into digital signals for transmission and digital signals back into artificial speech sounds for reception.
- From TIA TSB.102-A Glossary.

[13]MOS- Abbreviation for "Mean Opinion Score." An audio quality test.
- from TIA TSB102 Glossary

[14]QPSK-C family - A form of digital modulation which can use a C4FM FM transmitter or a CQPSK AM transmitter with a CFDD compatible receiver. This modulation method is a blend of 4-level FSK and □/4 DQPSK, which allows operation using either a transmitter with a frequency modulator using a class C power amplifier or a transmitter with an AM modulator using a linear class AB power amplifier. The CFDD compatible receiver is used for either transmitter.
- From TIA TSB.102-A Glossary

[15]FDMA (Frequency Division Multiple Access) - Access method that divides a communication channel into two or more individual channels.
-From TIA TSB.102-A Glossary.

[16]IMBE - Abbreviation for "Improved Multi Band Excitation" A voice coding technique based on Sinusoidal Transform Coding (analog to digital voice conversion).
- From TIA TSB.102-A Glossary.

The key parameters provide the basis for the development of the Project 25 suite of standards starting with the Common Air Interface.

The APIC Task Groups then worked to form documents for review and approval of APIC. Participation in the Task Groups is open to any member of APIC and provides focus groups to work on specific user needs requirements. The Task Group documents are presented for review and either rejection or approval by APIC. Documents approved by APIC are forwarded to the Steering Committee for further review and rejection or approval. In the event that the Steering Committee finds it necessary to reject a document, (to date none have been rejected) the document is returned, along with the reasons for rejection, to APIC and then to the initiating Task Group. The Steering Committee is not responsible for making changes to the document. Document changes remain the purview of the Task Group and APIC.

5 Project 25 Features

The Project 25 Standard anticipates the needs for both large and small systems in rural and urban areas. At the time the standard was being developed more than 85% of the Public Safety license holders had only 50 or fewer mobile units.

Users without a present spectrum problem may integrate Project 25 equipment into the system without any disruption by operating in the standard FM "backwards comparability" mode. The new equipment may be purchased as the user replaces aging equipment on a normal replacement cycle.

Interoperability with other systems may be conducted in either the digital or analog modes.

It is not expected that Project 25 equipment will be substantially more costly than the analog equipment in use today.

New Trunking standards further enhance interoperability and reduce system costs for users.

Open system interfaces provide the user with a choice of suppliers and manufacturers a choice of participation level.

> The open Common Air Interface insures that subscriber equipment from different suppliers will inter-operate on a Project 25 system. This is key to competitive procurement since subscriber units (mobiles and portable) constitute a major share of system costs.
>
> The open Data Interface is also important for inter-operability and the exchange of common information within and between systems.
>
> The open Inter-System Interface provides the means to interconnect separate RF Sub-systems, again important for interoperability and competition.
>
> The open Host Data Interface also is needed for the exchange of information between complex systems.

The open Interconnect Interface (PSTN[17]) allows access to the world wide telephone network

The open Network Management Interface is also important for the management of mixed supplier networks.

The open Console Interface (part of Project 25 Phase II effort) will permit similar capabilities to the other interfaces.

For more information on these interfaces and the Project 25 Standard in general see TIA TSB102-A Project 25 System and Standards Definition.[18]

6 Issues Discussed in *the report*

A difference of opinion is to be expected in any important endeavor and such debatable differences are the inspiration for improvement, it is however, important to maintain very strict rules of accuracy in the presentation of the issues. This is especially true whenever a different point of view is presented. Unintentional distortion may be occur as a natural result of the complexity of language but such distortions should be inconsequential in a typical good faith debate. If the distortions result in intentional misleading conclusions and contradict the written record they are either the result of a lack of understanding or part of an intentional plan to mislead. In either case then the value of the debate greatly diminishes.

In my opinion ***the report*** represents a cleverly crafted document assembled using excerpts and innuendo to portray the dedicated efforts of many professional public safety users and dedicated engineers as a failure. Unfortunately ***the report*** fails the test for unintentional distortion and clarifying comments are required. Section 6 of this review will be directed toward the more egregious claims made.

It is generally accepted that the Executive Summary is the area where summary statements are made without substantial support with the reasonable expectation that the body of ***the report*** will support the summary statements. The executive summary in this case is, unfortunately, a convoluted, distorted, and unsupported view of Project 25 shaped, at best, to cause confusion.

[17]PSTN Public Switched Telephone Network

[18]Available from TIA, 2500 Wilson Boulevard, Arlington, VA 22201, 703 907-7706

6.1 Spectrum efficiency

Spectrum efficiency is a term mentioned numerous times in ***the report***; page i, 3, 4, 5, 6, 7, 8, 10, 19, 20, 21, 22, 23, 24,25, 26, 27, 28.

The term "maximum radio spectrum efficiency" is presented early in ***the report*** as though it has some deterministic value yet, ***the report*** offers no description of "maximum radio spectrum efficiency". ***The report*** says (page 6) "An underlying problem is that there is no satisfactory measure of spectrum efficiency; rather, there are only imperfect surrogate measures." and finally (page 7) ***the report*** says "To conclude, it is difficult to measure the value of spectrum efficiency."

Yet ***the report*** criticizes Project 25 numerous times (page i, 4, 19, 20, 22, 25, 26, 27, 28, 29) for not achieving a goal which ***the report*** admits has "...no satisfactory..." measure.

the report states that "The Project 25 design offers essentially no short-run increase in spectrum efficiency". Instantaneous implementation of a Project 25 system will immediately deliver significant increases in spectrum use if the required funds are available. Therefore the improvements occur in less than "short run". A realistic phased implementation will avoid the financial and operational difficulties. A careful examination of ***the report*** does not reveal a solution for the financial and operational chaos faced by most Public Safety agencies for a system which has only one implementation option, instantaneous. The truth is that there is no solution except the ability to phase the implementation as presented by Project 25.

Even though the summary claims "...essentially no short-run increase..." it immediately explains that the "...efficiency gains it creates..." create a worse problem. "In other words buying Project 25 radios can be the first step in freeing public safety spectrum for other uses."

In essence ***the report*** espouses the theory "if you have it, do whatever it takes to keep it!, even if you don't need it, even if it is determined by the open regulatory process that the public interest is better served. ***The report*** has now traversed the range from essentially no improvement to the bogey man of confiscation of spectrum gains through "reassigned or auctioned off by the FCC."

Project 25 meets its published goals.[19]

In the section titled "Background on Project 25" (page 3) ***the report*** says "Speech compression and digital modulation techniques offer the opportunity of roughly another five-to-one efficiency increase over traditional 25 kHz FM technology." It also goes on to mention that other technologies; CDMA, cellular reuse, also offer "substantial increases"

Yet ***the report*** fails to identify any five-to-one efficiency candidates suitable for Project 25. What ***the report*** does not say in this excerpt is more revealing of ***the report*** intentions. A

[19]TIA TSB102-A Appendix C Statement of Requirements Page C-1 For example current analog systems in the 150 MHz band are spaced on either 25 or 30 kHz. The obvious result of dividing 25 by 12.5 is 2.

number of different systems have been proposed during the recent FCC refarming discussions. None have been found to be practicable under the conditions required for Project 25 and the parameters discussed in part I, section A of ***the report***.

While criticism of Project 25 continues nothing is offered which will satisfy the stated user needs and demonstrate equivalent or better performance.

6.2 Frequency Division Multiple Access (FDMA)

In a number of places ***the report*** uses the pejorative "old-fashioned" with reference to the access method; Frequency Division Multiple Access (FDMA).

As ***the report*** indicates FDMA has been used many times as technological progress permitted improved spectrum utilization because it was the method most suitable to solve the problems presented. That is hardly a reason to call FDMA "old-fashioned".

Technical progress certainly permits the consideration of different access methods. Project 25 selected FDMA after careful evaluation of the different access methods available. FDMA was simply the best choice to satisfy both the technical and administrative needs of the diverse Public Safety community.

FDMA, in concert with the other key technology selections, allows the phased implementation of new digital technology toward the goal of improved spectrum use without requiring the instantaneous implementation of whole systems required by other proposals.

The FDMA concept is hardly older than TDMA or CDMA it has just been more technology tolerant and practical to implement. To criticize FDMA as "old fashioned" is somewhat like calling a computer that uses binary arithmetic "old fashioned". [20]

[20]For more on Multiple Access Systems see Techniques of Multiple Access for Radio Systems, William Gosling December 1, 1993

6.3 Increased Competition

6.3.1 Open Interfaces

The executive summary (page i) reports; "The Project 25 design restricts competition over the system life cycle". To illustrate this ***the report*** accuses Project 25 of presenting a closed standard at the a highly important "A interface" to in order to present a monopoly supplier environment.

the report refers to an "A interface" taken from the Cellular industry. Project 25 uses an "A" interface but it is the Radio Data Peripheral Interface for Mobile and Portable subscriber units.[21]

Later in ***the report*** (page 14) a figure from TIA TSB102 has been overlaid with the "Boundary of Key Missing Open Interface in Project 25".

The placement of the overlay and the supporting text do not offer a clear explanation of the "A interface" purpose in a typical Public Safety repeater and as a result it is not clear what ***the report*** intends to portray.

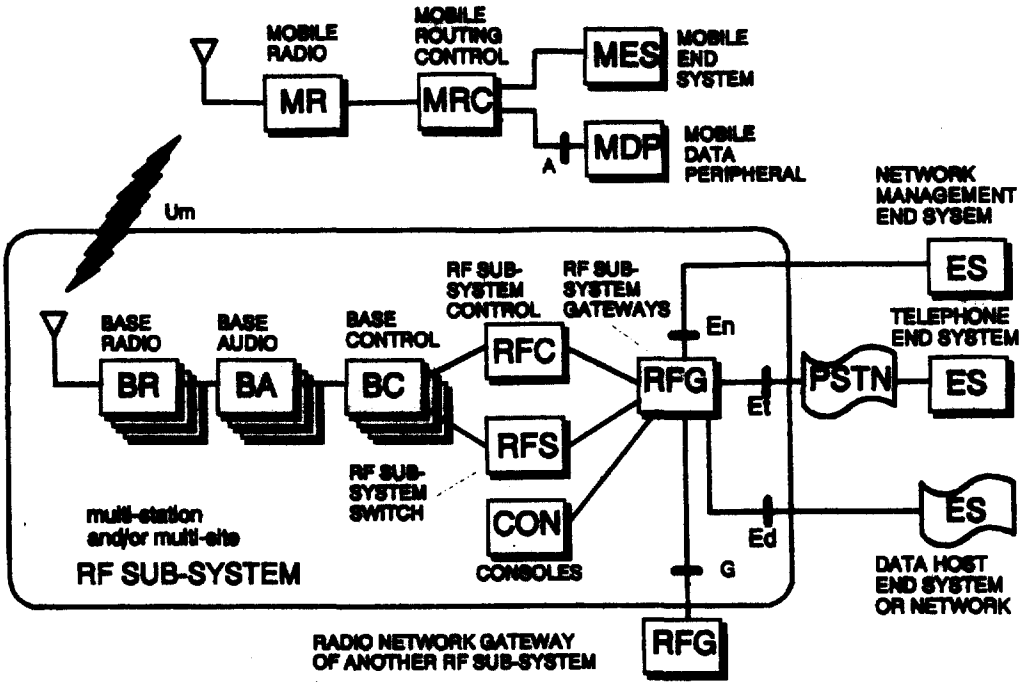
The original figure, below, clearly shows some of the many Project 25 open interfaces surrounding the RF Sub-system Gateways (RFG) for Public Safety systems. Cellular systems do not normally use these interfaces. It is important to note that the RFG from any RF Sub-system can connect with the RFG in any other RF Sub-system in Project 25.

An additional interface will be considered in Project 25 Phase II programs to cover a console interface. However Cellular systems do not use a console interface.

The Cellular industry "A interface" was designed to satisfy the needs of the Cellular industry. Cellular fixed station requirements, while very complex, are significantly less diverse than Public Safety fixed stations. Cellular fixed station transmitter/receivers are usually configured in a single operational mode, a duplex transmitter/receiver.

Public Safety systems may be configured in many different modes, a simple local control single transmitter/receiver, a remote controlled single transmitter/receiver, a single duplex transmitter/receiver like a repeater, through a multiple transmitter/receiver configuration as used in trunking stations that have control requirements similar to a Cellular Systems.

[21]TSB102-A Appendix B Glossary of Terms, Acronyms and Abbreviations, Page B-1



Typical Repeater (example) Reference Configuration

The report attempts to compare Cellular systems with Public Safety systems in several places. Most of these comparisons are not valid

Project 25 has the appropriate interfaces necessary to serve the Public Safety users. These interfaces are open to any supplier.

6.3.2 Essential Property Licensing

The executive summary (page i) states that "Proprietary technology also reduces the incentives for vendors to enter the Project 25 systems market and limits the backwards compatibility of Project 25 systems."

What system in operation or proposed does not use "proprietary technology"? The free market system of the U.S. thrives on innovation and inventions. The important part of the Project 25 Standard is that, by definition, the proprietary technology essential for implementation of the standard are available with license terms free of discrimination.

The use of proprietary technology in this industry is no different than that encountered in any industry, in fact, some what less because Project 25 requires licensing of essential proprietary technology. Cross licensing is the expected result of standardization.

The report says (page i) "Project 25 does not enforce backwards compatibility; manufacturers signing the Project 25 IPR agreement do not have to provide the licensing

necessary to guarantee backwards compatibility."

There is no exemption on the requirement for backward compatibility in the Project 25 agreement on essential intellectual property.

There is nothing in the Project 25 Standard that prevents any vendor from participating in Project 25 systems development.

6.4 The Open Process

The summary (page i) says "The Project 25 process has not involved....".

The report carefully crafts an innuendo that insinuates that somehow the Project 25 process was responsible for a lack of involvement by major companies such as AT&T and Hughes.

The innuendo continues (page 16) "One of the most problematic characteristics of the Project 25 process is how few of the world's major radio manufacturers currently participate or have participated....". ***The report*** then goes on to mention additional companies; QUALCOMM, NorTel, Nokia, Phillips, Alcatel, Matra, Bosch, Mitsubishi, and NEC.

Nothing could be further from the truth. All these companies have been aware of the process and some may have attended meetings. The choice not to participate was theirs alone.

These companies are major respectable electronic companies involved in many facets of communications worldwide. They have, to date, not chosen to become involved in the Public Safety Land Mobile Equipment business. To single them out with the inference that they were somehow excluded, as if someone could exclude these giants!, is absurd.

Most of the companies mentioned have, for their own business reasons, have chosen not to participate in the U.S. Land Mobile market. Their participation has been solicited. How Project 25 was expected to be involved in "Bringing these firms into the process" is not explained in ***the report***

Any of these companies could manufacturer the communications equipment defined by the Project 25 Standard if and when they choose to. .

In an attempt to denigrate the Project 25 process ***the report*** says "Project 25 is governed by a Steering Committee established by APCO."

Project 25 was established by APCO and the Steering Committee is made up from the members of APCO, NASTD and Federal Government Representatives.

The Project 25 Steering Committee has not and does not formulate the Project 25 standards. The Steering Committee is responsible for the review and approval of proposals offered from the Task Groups operating in APIC.

Before any selection is made by the Steering Committee anyone and everyone is entitled to present their positions in the Task Groups, before APIC and if desired to the Steering

Committee. The term "governed" is certainly a misnomer - guided might be a more accurate representation.

TIA procedural rules have been followed in the Ad Hoc Task Groups which prepared the documents used in the Project 25 Standard.

TIA Documents such as those quoted in ***the report*** were prepared in TIA committees which met all of the TIA requirements for the specific documents.[22]

The report also says (page 17) that the process should be inclusive in order to lower the costs of entering the land mobile radio business to companies such as Hughes.

How is it that smaller companies such as Bendix King, E.F. Johnson, and Transcrypt have found the funds to enter and be successful in the land mobile business and yet a company (GM) with sales exceeding most countries gross national product needs some special inducement to enter the business?

The thought that the larger companies mentioned in ***the report*** required special incentives is preposterous, and ***the report's*** serious insinuation of exclusion is without any basis in fact.

The process is inclusive.

The Project 25 process is open and does/has not provide special inducements to any company or agency. There is no question that the advent of a Project 25 open standard is a threat to some companies who fear the involvement of smaller companies and would prefer a phantom standard in order to keep the status quo.

6.5 User Friendliness

The summary indicates that Project 25's narrow band architecture compromises user friendliness because of a lower data rate than wide band systems.

The Project 25 system is capable of providing equivalent or greater data rates of any other proposed system subject to the same constraints as those imposed by the users on Project 25. The so called superior "..wide band architecture..." referred to in ***the report*** is not defined.

The open Project 25 process has relied on inputs from the major Public Safety user groups in the U.S. to provide the direction for a "user friendly interface". Obviously the final evaluation of any proposed system is the system user. The Project 25 process is User driven and supplies the requirements determined by the Users.

[22]The TIA approval requirements exceed the current requirement used by the American National Standards Institute (ANSI)

6.6 System costs

After indicating (page 7) that some authors have an opinion that geographic reuse provides the greatest key to spectrum efficiency through the use of micro cells, ***the report*** goes on to say that "Project 25 design has gone just the other way (complex channel coding... "and that "The Project 25 design makes all systems — rural and urban, small and large — bear the *costs of complexity*." *(emphasis added)*

It is well known that the *cost* of cell development continues to be a deterrent preventing Cellular services from taking full advantage of the reuse (micro cell) capability. Not only have Cellular services been forced to return to the spectrum well, they now look to employ more complex channel coding techniques in order to maintain cost control.

Relative to a Cellular system the Project 25 system unit is a simple robust design.

This appears to be another attempt in ***the report*** to distort by association.

The report asks this question; (page 7) "Is it efficient for a sheriff [in a] rural area to spend many thousands of dollars for a narrow-band radio system to conserve 'scarce spectrum' in a region where there are many vacant channels?"

Project 25 has anticipated the needs for both large and small systems in rural and urban areas. Users without a spectrum problem may integrate Project 25 equipment into the system without any disruption by operating in the mandated "backwards comparability" mode. The new equipment may be purchased as the user replaces aging equipment on a normal replacement cycle. Interoperability with other systems may be conducted in either the digital or analog modes. It is not expected that Project 25 equipment will be substantially more costly than any other equipment.

It is very efficient to utilize phased replacement plan which permits the controlled employment of more spectrally efficient technology within the budget constraints of any public safety agencies. The timing of any implementation plan using the Project 25 Standard is determined by the needs of the user, both operational and financial, not some artificial requirement to replace equipment.

6.7 *The report* Point of view

In the preface ***the report*** claims to "...looks at the issues from the point of view of the individual Public Safety agency..." Since users from Federal, State and Local Government organizations representing a majority of Public Safety users have been the stimulus for Project 25 one must wonder what unidentified public safety agency views are being represented.

Surely these views can be presented by the unidentified agency in direct debate to the ones presented in writing by Project 25. One certainly hopes the views represented as from an individual Public Safety agency are not merely as claimed in ***the report*** acknowledgment - "The conclusions are those of the author and Strategic Policy Research and do not necessarily represent the views of any other organization. This study was sponsored by Ericsson."

7 Summary

Project 25 meets its published goals. There are many benefits gained from the Project 25 Standards effort. The following list summarizes a few of the major benefits:

- The provision of unit to unit communications without the required use of repeater stations
- Backward compatibility allows implementation of new technology with minimum administrative and financial disruption.
- Multi-supplier procurement.
- Unprecedented interoperability between different groups.
- Increased spectrum utilization.
- Migration to ever greater spectrum utilization in Phase II.

As previously mentioned the outstanding result is the product of unprecedented cooperation between users, service providers, and the manufacturing community. The forums provided by APIC have allowed open participation from all facets of both the users and industry. This will continue in Phase II.

In fact, Project 25 will exceed its goals.

APCO Project 25
A User Need to be Met

Motorola Will Meet Public Safety Communications Needs in 1996 and Beyond with Compliance to APCO Project 25

by Motorola Inc.